

Program to Evaluate High Resolution Precipitation Products (PEHRPP)

A Contribution to GPM Planning

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- GPM objectives require improved methods of integrating precipitation observations into complete fields (analyses)
 - Note that this is a more stringent requirement than simply operating and calibrating observations from a constellation of satellites
- Goals of PEHRPP:
 - Characterize errors in various high resolution precipitation products (HRPP) on many spatial and temporal scales, over varying surfaces and climatic regimes
 - Enable developers of HRPP to improve their products and potential users to understand the relevant characteristics of the products
 - Define data requirements and computing resources needed for retrospective processing of HRPP
- Bring together scientists with different rainfall concerns:
 - Developers and producers of high resolution precipitation products (HRPP)
 - Providers of basic data (satellite observations, surface radar, rain gauge reference networks)
 - Users of high resolution precipitation fields

PEHRPP Hypotheses

Relevance
to GPM (GV)

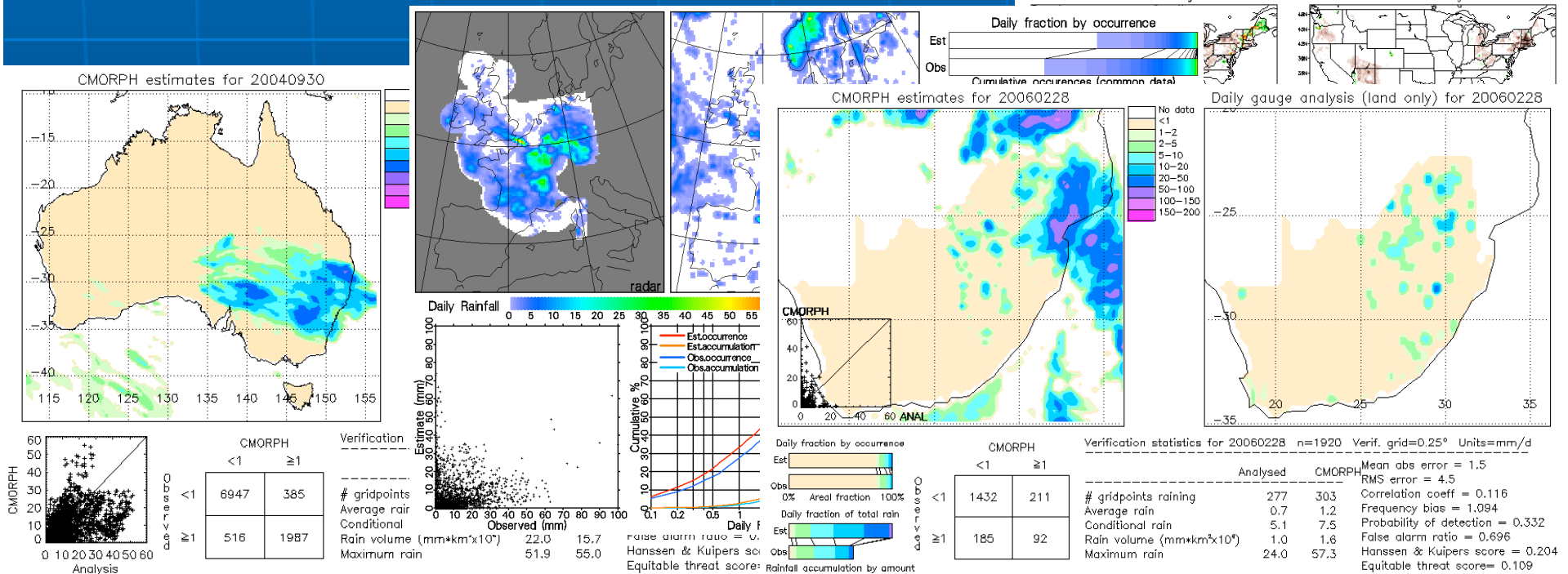
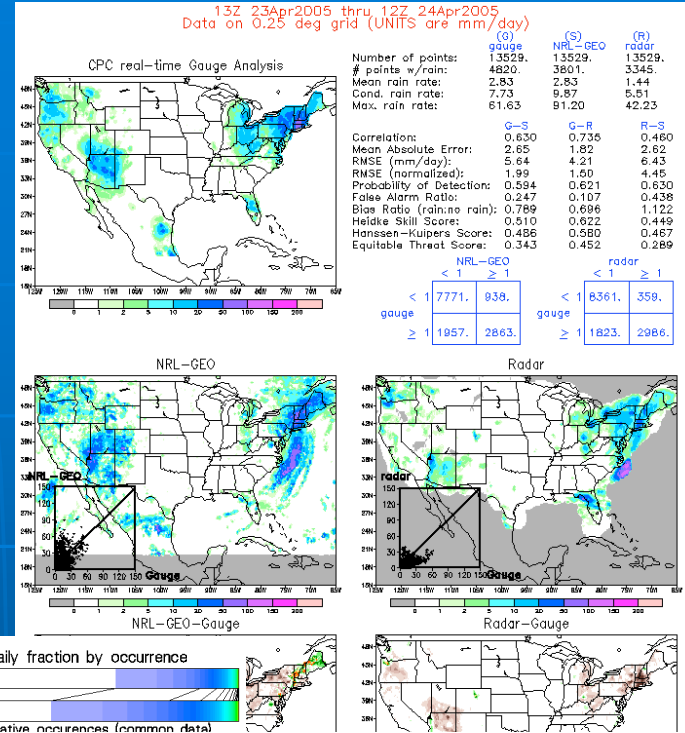
1. HRPP errors can be characterized by comparing them to independent observations from rain gauges and radars.
2. Errors of and differences between HRPP are meaningful, in that they can be systematically related to precipitation characteristics and/or algorithm methodology.
3. Improved HRPP can be derived by combining products or methods based on the observed errors and differences.
4. HRPP spatial and temporal variability is realistic on scales appropriate for scientific studies (e.g., hydrology).
5. Numerical weather prediction forecasts of precipitation can be used to improve HRPP in some locations and times.



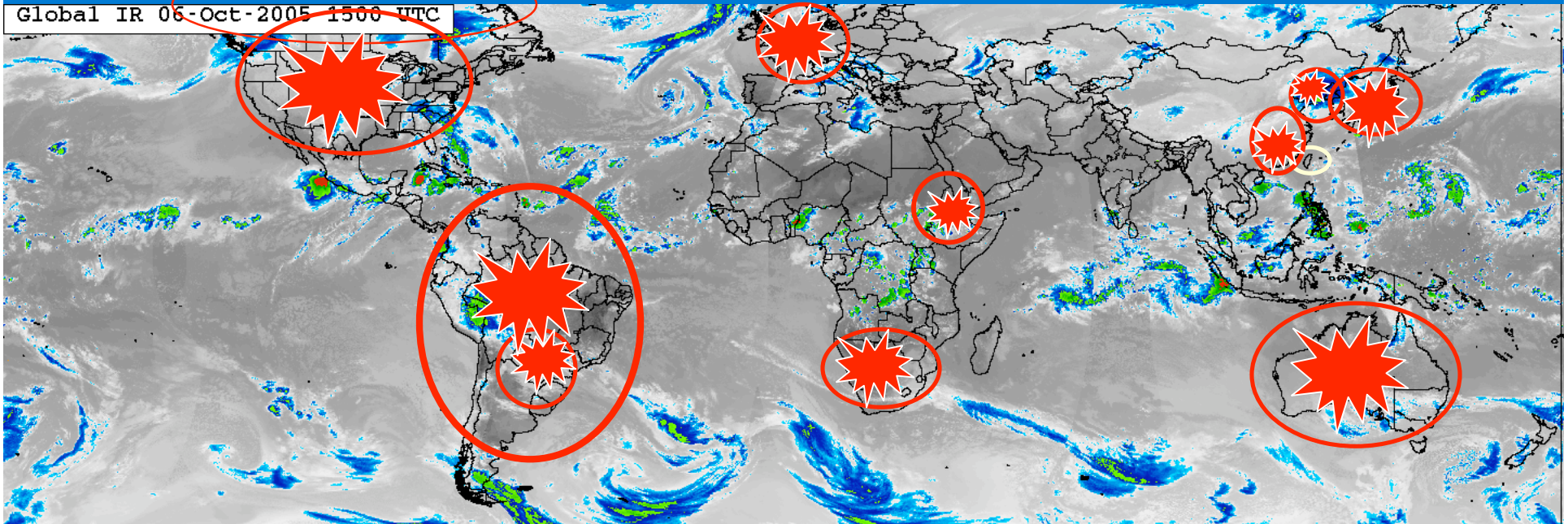
PEHRPP Consists of 4 Suites of Activities

Suite 1: Continental/Regional Comparisons

- Large areas, long (continuous) time periods
- Focus on daily totals over $0.25^\circ \times 0.25^\circ$ areas
- Observations from national rain gauge and radar networks
- Where possible, evaluate diurnal variability of HRPPs using three-hourly or finer resolution



Current/Proposed PEHRPP Suite 1 Validation Sites



Original:

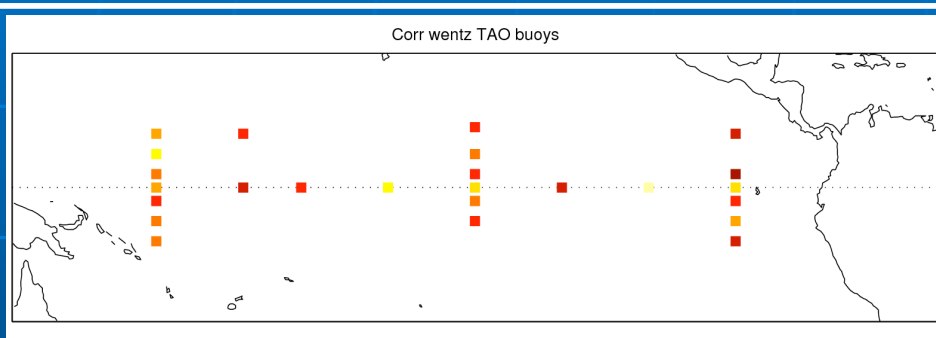
Australian continent (Ebert), CONUS (Janowiak), UK/Europe (Kidd)

New:

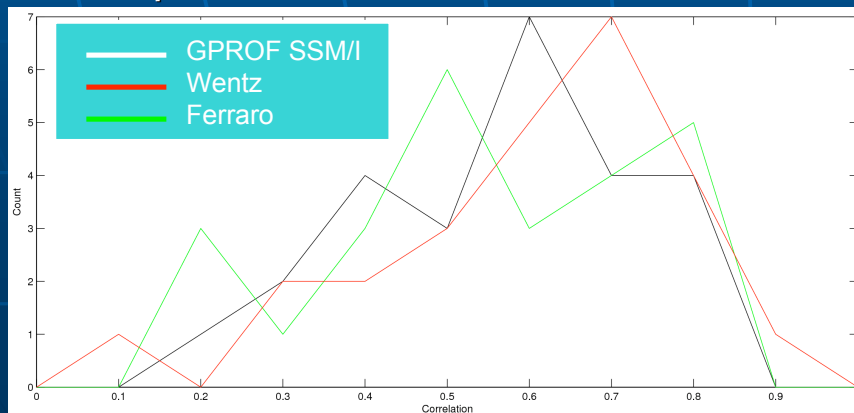
Brazil (Guetter, Pereira), S Africa (Visser/Mngadi), Korea (Sohn), Taiwan (Jou), Japan (Ushio), Ethiopia/Sub-Saharan Africa (Dinko), Guangdong (Liang)...

Suite 2: High time resolution comparisons over selected limited regions

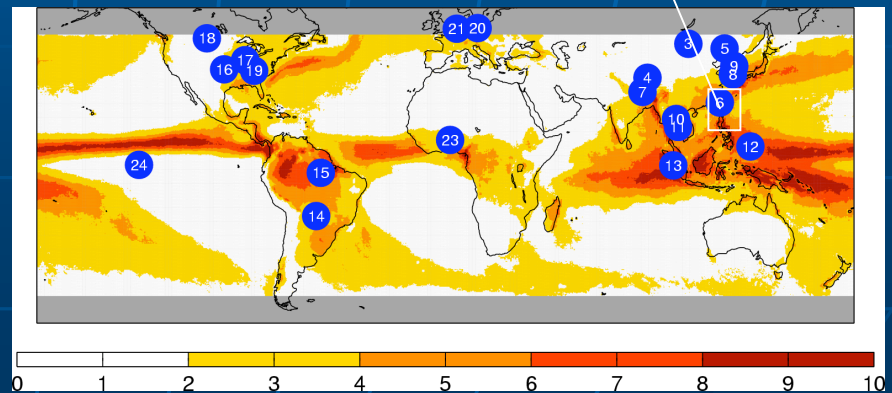
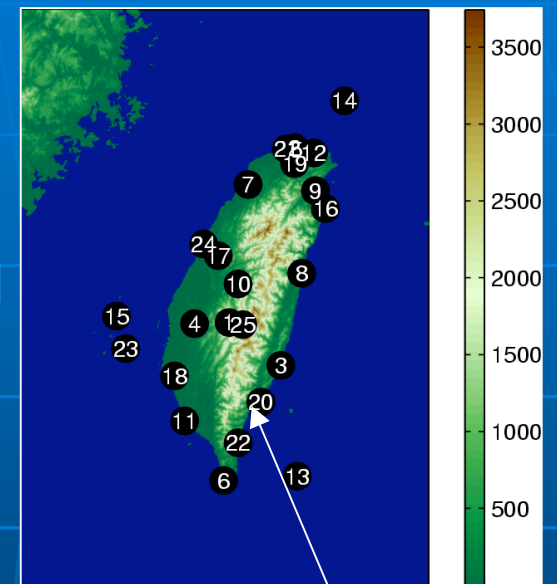
- Focus on three-hourly totals over $0.25^\circ \times 0.25^\circ$ areas, or finer resolution over wide variety of climatological and physical regimes



- Utilize TAO/TRITON buoy rain gauge data for tropical ocean rainfall

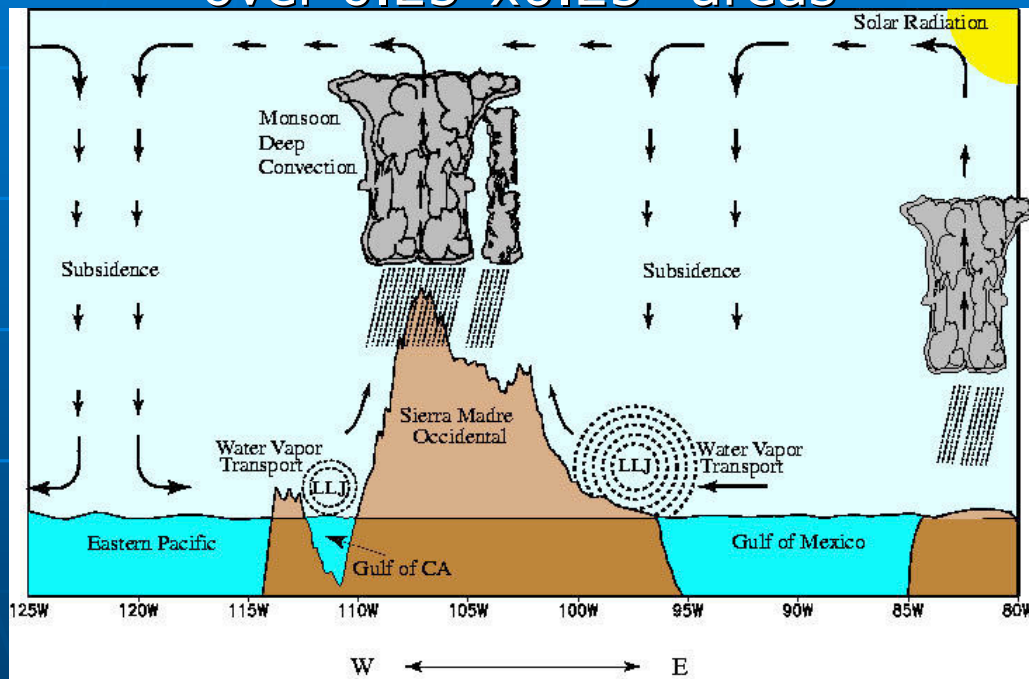


CEOP
(Coordinated
Enhanced
Observing
Period) sites

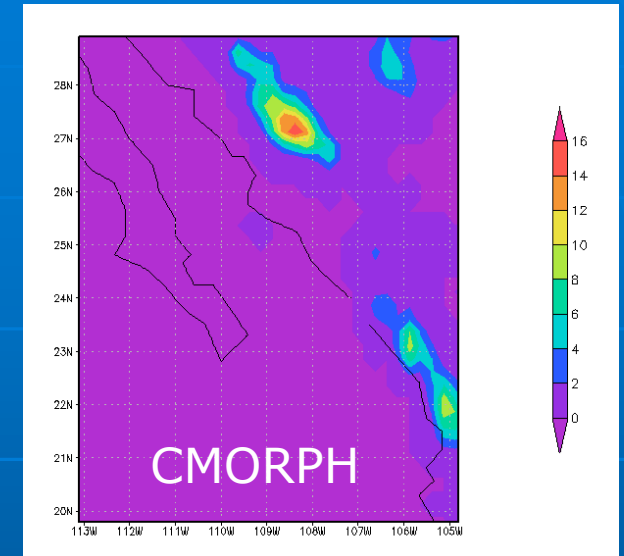


Suite 3: Very high quality field program data sets

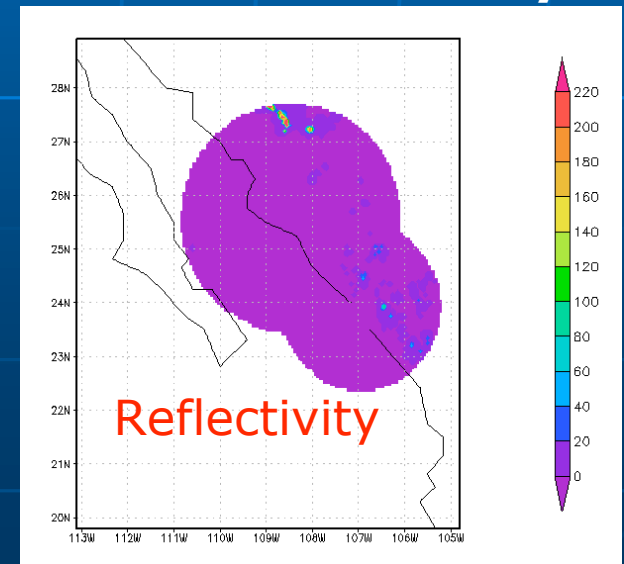
- Selected field programs (**NAME**, **KWAJEX**, LBA, Florida, SCSMEX,)
- Focus on three-hourly totals over $0.25^\circ \times 0.25^\circ$ areas



The NAME combined radar dataset will allow us to evaluate the performance of the various high resolution precipitation products in the North American Monsoon.

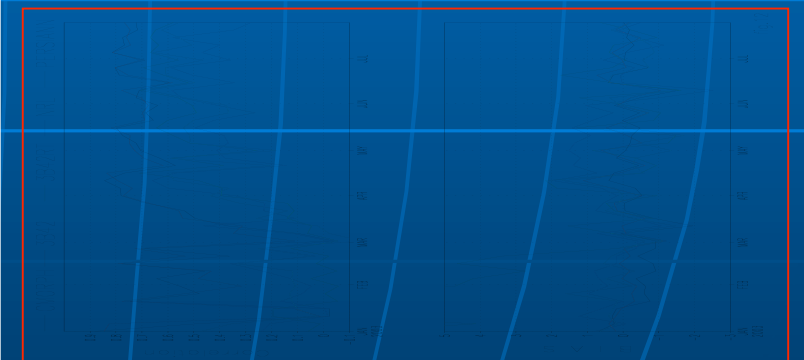
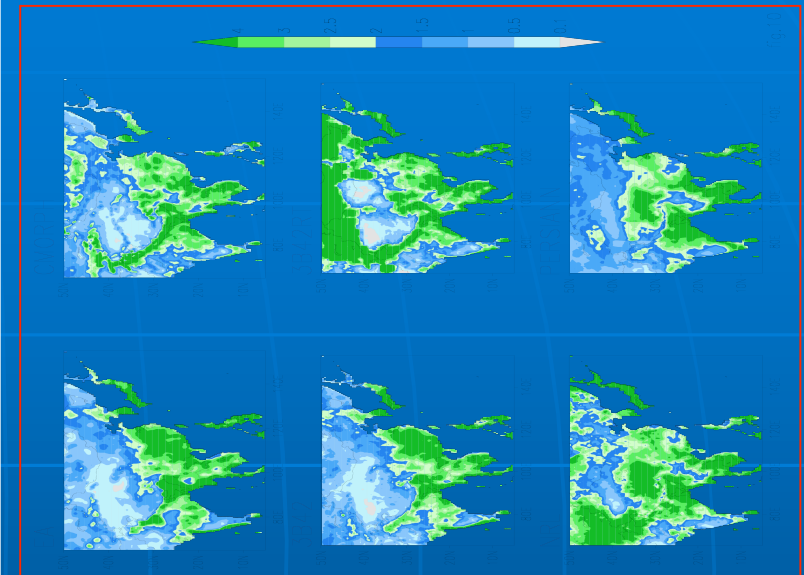
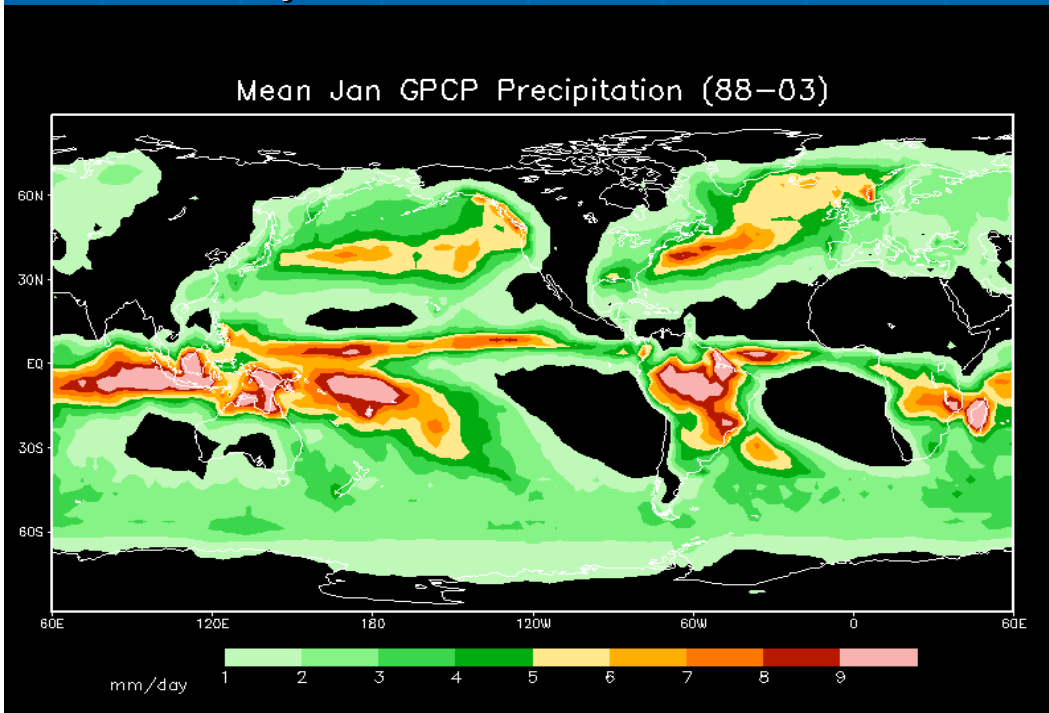


0000 UTC 11 July



Suite 4: "Big picture" comparisons

- Validation of large-scale quantities and characteristics against bulk quantities, existing products (GPCP, CMAP, etc.), streamflow data sets, water budgets, and subjective judgment
- Identify artifacts not evident in detailed statistics of above suites
- Focus on thousands of kilometers and monthly time scales



Comparing several HRPP
against East Asian gauge
analysis (Xie et al., 2006)

PEHRPP STATUS/SCHEDULE

- PEHRPP has been established to facilitate collaborative analyses among the many scientists and institutions involved
 - PEHRPP is diverse, with many countries and institutions involved
 - It is almost entirely voluntary, with participants supporting their own work for the most part
 - Many PEHRPP interim results were discussed at IPWG in Melbourne
- Goals and objectives of PEHRPP seem to complement those of GPM algorithm and ground validation efforts very well
- How can GPM best capitalize on PEHRPP activities?
 - Many studies are in progress now; many will be far enough along to support meaningful conclusions and recommendations about a year from now
 - IPWG will organize a PEHRPP Workshop during October – December 2007 to summarize results and develop recommendations

IPWG-2006 (Melbourne, 23-27 October)

- Approximately 60 attendees representing 15 countries
- Coordinated with APSATS (Asia-Pacific Satellite Training Seminar)
- Some Key Recommendations to CGMS (full workshop summary in preparation):
 - IPWG stands prepared to support the Frequency Allocation Working Group recommendations for microwave channels
 - IPWG recommends the installation of an additional Megha-Tropiques ground station to support more timely access of microwave datasets

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IPWG-2006 (Melbourne, 23-27 October)

- Key Recommendations (continued):
 - Documentation and availability of sensor characteristics and calibration by operational agencies. NOAA and/or the IPO should routinely report on the operational status, upcoming changes, and future launch schedule of DMSP and NPOESS to CGMS. Data preservation of level-0 data and procedures are needed in order to properly blend and mix products from various passive microwave instruments
 - IPWG recommends maintaining operation of both conical scanning microwave imagers and crosstrack scanning sounders on the same satellite platform, in order to satisfy sensor-blending techniques and intercomparisons, thereby maintaining high quality data requirements in data assimilation and precipitation retrieval

IPWVG-2006 (Melbourne, 23-27 October)

- Key Recommendations (continued):
 - IPWVG asks ESA to clarify the status of EGPM and encourages ESA and other European agencies to strongly support combined passive and active precipitation observation from a dedicated satellite
 - IPWVG encourages NOAA to act on the recommendations provided in the recent National Academy of Sciences report, “NOAA’s Role in Space-Based Global Precipitation Estimation and Application.”

IPWG-2006 (Melbourne, 23-27 October)

- Key Recommendations (continued):
 - Proposes PEHRPP Follow-On Workshop to be held at the WMO in Geneva in late 2007
 - Proposes a second JCSDA workshop focused on the assimilation of precipitation observations and to support joint efforts between the observation and data assimilation communities (follow-on to 2005 workshop)
 - Proposes a second “Snow and Cold Season Workshop” to be held in 2008 (follow-on to 2005 workshop)
 - IPWG encourages coordination of future interactions between ITWG and the International Winds Working Group, including a possible joint workshop on common issues